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A New World Order For Acquisition?

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ABSTRACT

The United States is developing a new defense strategy as one facet of its overall national security strategy as a result of dramatic changes in the international environment brought about by the end of the Cold War. One major pillar of this strategy is reconstitution which involves maintaining technology and innovation necessary to retain a decisive military competitive edge and the ability to activate the industrial base on a large scale to meet an emerging threat.

A new weapons acquisition approach is also developing to support this strategy which emphasizes research and development, increased prototyping, modification of existing systems, reduced quantities and rates of production, and expanded government oversight of the industrial base.

This paper examines the new acquisition strategy as it relates to the concept of reconstitution, its planned management structure, and implications for the US defense acquisition process. It specifically addresses the areas of research and development, weapons systems acquisition, and the defense industrial base. The paper concludes with a brief look at the French experience using a similar defense acquisition approach.

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A New World Order - A New US Order

For some forty years, the Cold War waged. The United States faced formidable foes in the Soviet Union and the Warsaw Pact. World political geography was clearly defined in terms of East vs West. The Department of Defense was born in this environment and, along with its military-industrial complex, developed a culture steeped in countering the omni-present Soviet threat. With the fall of the Berlin Wall in November 1989 and the dissolution of the Warsaw Pact, a new world order is emerging. The new "threat" is multipolar and not as predictable. The focus provided by the Soviets to our weapon systems requirements and planning for four decades is blurring. When US military action is conducted, it is expected to be within a regional multilateral context.

In the US domestic environment, a new order is also emerging. Emphasis is being placed on economic strength, industrial global competitiveness, defense downsizing and conversion. The US has developed a defense strategy as one facet of its overall national security strategy to provide a roadmap as it begins its journey through these new environments:

> "In the face of competing fiscal demands and a changing but still dangerous world, we have developed a new defense strategy that provides the conceptual framework to... guide our restructuring so that our remaining forces are appropriate to the challenge of a new era. The four fundamental demands of a new era are already clear: to ensure strategic deterrence, to exercise forward presence in key areas, to respond effectively to crises and to retain the national capability to reconstitute forces should this ever be needed."[1]

The military/economic strategy of reconstitution has far reaching implications for the US defense culture. This paper will examine this new strategy, its planned management structure, and implications for the US defense acquisition process. It will specifically address the areas of research and development, weapons systems acquisition, and the defense industrial base.

What is Reconstitution?

According to the 1992 National Military Strategy, in addition to force mobilization and manpower, reconstitution involves activation the industrial base on a large scale, maintaining technology and innovation necessary to retain the competitive edge in decisive areas of potential military competition. Its purpose is "to deter such a [potential adversary] power from militarizing and, if deterrence fails, to provide a global warfighting capability."[2] An integral facet of reconstitution capability involves the restructuring of how we manage research and development as it pertains to science and technology and weapons systems development. The National Military Strategy for 1992 describes this new approach:

> "Beyond the requirement for a reconstitution capability, is the compelling need for continued and significant research and development in a wide spectrum of technologies, applications, and systems...Product improvement, modernization, and technological innovation all flow from research and development, and, if properly protected, have dramatic impacts on battlefield effectiveness and on our ability to reconstitute fighting forces in the future. Since we currently have the most technologically advanced systems in the world, our future investment

choices may require a different acquisition strategy than we have followed in the past. For example, full scale production may not always follow prototyping. We need to protect the capability to produce the world's most technologically advanced weapons systems, but only if required."[3]

Reconstitution reflects a national security strategy which is designed to allow the US to dramatically reduce its military/industrial investments from Cold War levels, while maintaining sufficient deterrent and warfighting capability to pursue its national interests. Consequently, this is a very selective investment strategy for research, development and weapons systems procurement. The proposed structure and process to execute such an investment strategy is grounded firmly in the current acquisition approach but contains several dramatic differences.

A New Acquisition Strategy

Building on the pillar of reconstitution, a new weapons acquisition strategy was formed in early 1992. This approach was articulated by the Secretary of Defense:

"The old US acquisition strategy placed a premium on rapid development and procurement of new systems to counter rapidly evolving Soviet capabilities... Under the new US acquisition strategy, there will be heavy emphasis on government-supported R&D to maintain technology base. More work will be done with prototypes to demonstrate capabilities and prove out concepts. We plan to go to production on fewer systems, and only after having taken the time to prove out the concept. We will rely more more often on inserting new capabilities into existing platforms and upgrades, instead of building totally new systems. We will also place greater emphasis on producibility of systems and manufacturing processes."[4]

The Undersecretary of Defense for Acquisition, USD(A), expanded on the approach in May 1992.[5] He pointed out that reduced defense acquisition budgets mean that DOD will accept less risk in acquisition programs than it nas in the past. Critical technologies, on which any new system relies, will have to be proven before initiation as a formal acquisition program at Milestone I. This linkage between technology development and the weapon system acquisition milestone process is provided in figure 1. In addition, USD(A) indicated that only systems which are cost effective and have a clear military requirement will be produced. He stated that the significantly reduced production would require a stronger DOD role in the oversight of the US industrial base to identify and manage possible critical production capability deficiencies. The new acquisition strategy, therefore, consists of five elements:

(1) increased emphasis on R&D to maintain technology base

(2) significantly reduced risk acceptance through increased prototyping and testing

(3) increased reliance on existing systems and reduced urgency to develop new weapons

(4) reduced quantities and rates of production

(5) expanded government oversight of the industrial base

This new strategy is not expected to change radically with the new administration. In a February 1992 white paper written by then Representative Les Aspin, now Secretary of Defense, the same basic elements are described with a few exceptions.[6]

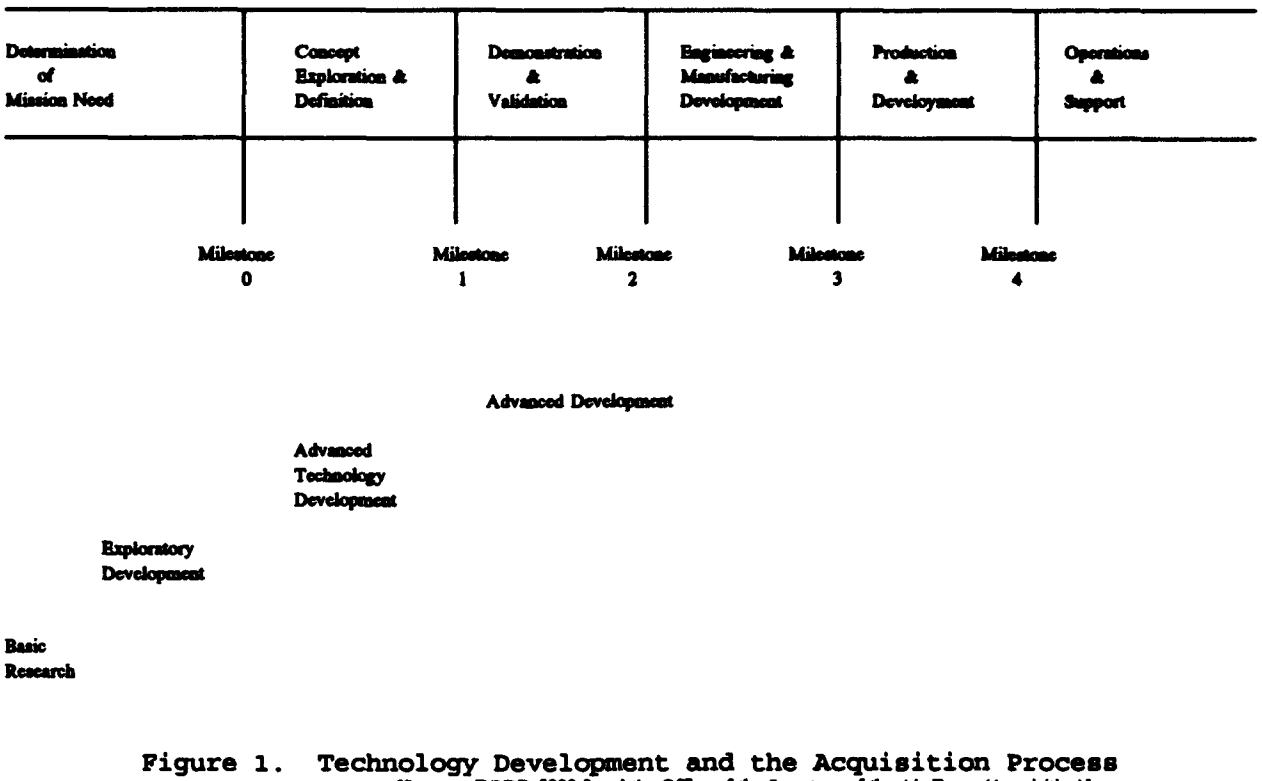


Figure 1. Technology Development and the Acquisition Process
[Source: DODD 5000.2 and the Office of the Secretary of the Air Force (Acquisition)]

The initial implementation of this strategy is reflected in the DOD budget request for FY 1993 and DOD outyear budget projections. DOD's budget request for FY 1993 was $267.6 billion which represents a 7% reduction after inflation from FY 1992. R&D funding rose slightly by 2% after inflation while procurement funding dropped 13% after inflation. By 1997, DOD projects that their budget will fall below $240 billion in constant FY 1992 dollars which represents a 36.8% decrease after inflation from FY 1985.[7] R&D funding is expected to decline by 33% and procurement funding is expected to drop by 50% over the same period. Most analysts are predicting that by FY 2000, the DOD budget will be between $180 and $220 billion in FY 1992 dollars.[8]

The new acquisition strategy involves new management directions for research and development, the weapons systems acquisition process, and defense industrial base. These new directions will be examined in more detail in the following sections.

A Centralized Approach toward Research and Development

The Director of Defense Research and Engineering (DDR&E) is responsible for the management of DOD's science and technology program which includes basic research, exploratory development, and advanced technology development. Basic research is conducted in fundamental science and engineering areas to create or modify

scientific breakthroughs and prevent technological surprise. Its view is normally long term to provide basic foundations for further scientific and engineering progress. Exploratory development builds upon the basic research foundation and transitions promising technologies for potential weapon systems applications. Advanced technology development refines this process even more with the fabrication and demonstration of hardware and software applications.

In the past, decentralization was the cornerstone of the management approach with DDR&E providing oversight through monitoring activity. The services and agencies defined the focus and thrusts of their respective Science and Technology (S&T) programs within the context of broad based technology areas identified by DDR&E.[9] The services then submitted their plans for technology investment to DDR&E for approval. DDR&E would monitor investment spending in the technology areas and generate issues for intervention as necessary. This approach provided a strong bottom-up character to technology development planning. However, the process was not considered conducive to providing an integrated approach to technology investment planning and decision-making.[10]

The new S&T strategy attempts to remedy this through increased research concentration and management centralization (see figure 2). The strategy focuses on:

- sustaining and applying the dramatic advances in information technology to weapon systems' command,

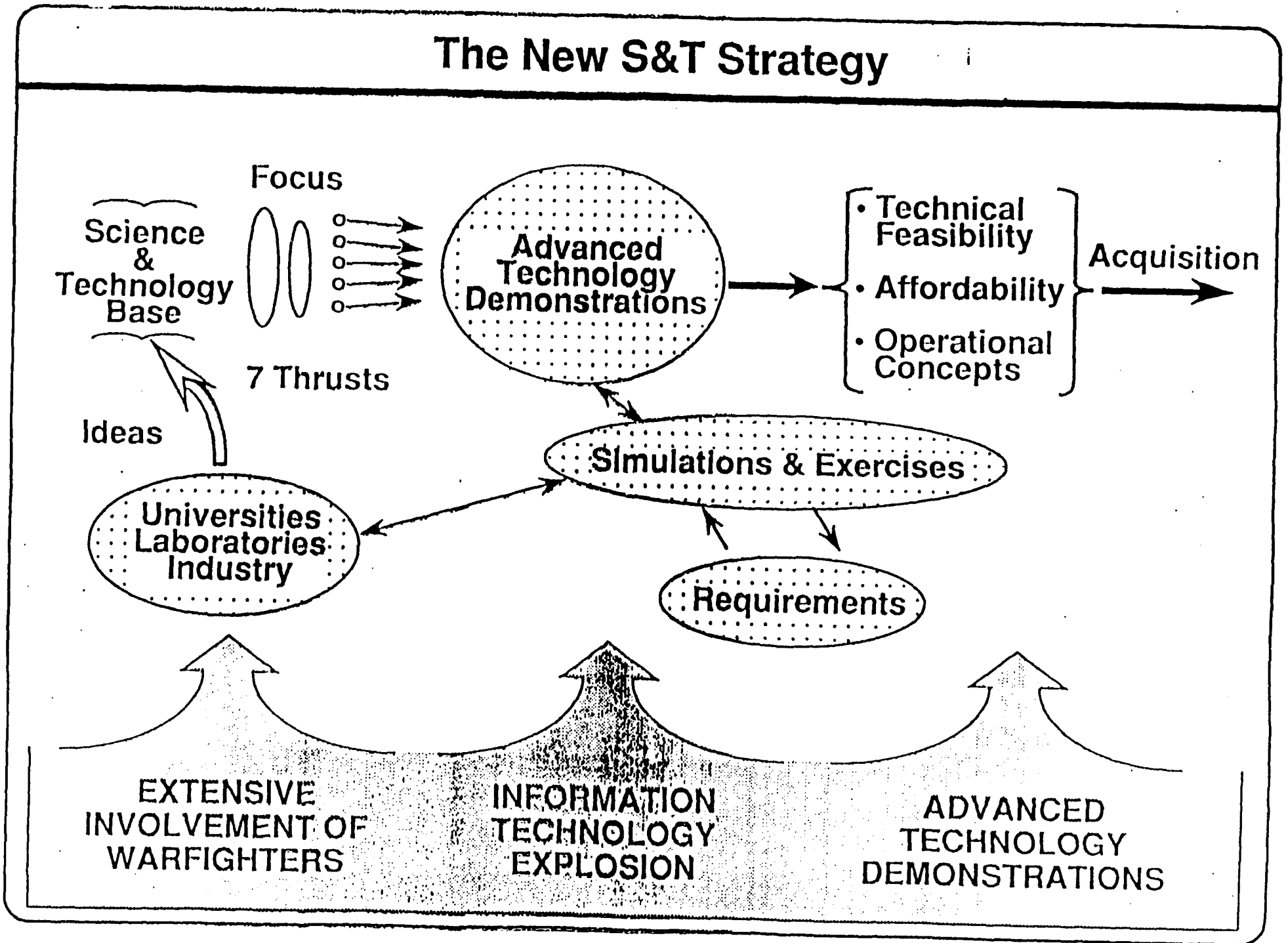


Figure 2
(Source: Defense Science and Technology, DDR&E, July 1992)

control, communication, and intelligence structures as well as increasing reliance on computer simulation to improve technology evaluation and force effectiveness

- involving the user early and continuously to identify warfighter's needs and new technology available

- demonstrating the technology extensively and realistically through the use of Advanced Technology Demonstrations (ATDs).[11]

The new strategy will involve significant changes to the ructure of exploratory development and advanced technology development programs. The central theme of the S&T program will be to focus on seven thrusts to emphasize the warfighters' needs. These specific thrusts are:

- global surveillance and communications
- precision strike
- air superiority and defense
- sea control and undersea superiority
- advanced land combat
- synthetic environment
- technology for affordability[12]

In the exploratory development area, 11 key technologies have been identified and prioritized to support these thrusts (see figure 3). The most dramatic change is in the advanced technology development area with the creation of Advanced Technology Demonstrations (ATDs) within each of the seven thrust areas. These will be used to demonstrate both weapon system concepts and more generic "enabling" technologies which may provide dramatic increases in military capability through their application (e.g., "stealth" techniques for radar evasion). According to USD(A), these technology demonstrations will play an increasingly important role in the decision-making process for

S&T Management: *Key Technology Areas*

Key Technology Area / Thrust	(1) Computers	(2) Software	(3) Sensors	(4) Communi-cations Networking	(5) Electronic Devices	(6) Environ-mental Effects	(7) Materials and Processes	(8) Energy Storage	(9) Propulsion and Energy Conversion	(10) Design Automation	(11) Human-System Interfaces
(1) Global Surveillance & Communications	o	o	●	*	●	o	o	o	o	o	o
(2) Precision Strike	o	*	●	●	o	o	o	o	o	o	o
(3) Air Superiority and Defense	●	o	*	o	●	o	o	o	o	o	o
(4) Sea Control and Undersea Superiority	●	o	*	o	o	o	o	o	o	●	o
(5) Advanced Land Combat	o	o	●	●	o	o	*	o	o	o	o
(6) Synthetic Environments	o	o	o	o	o	o				●	*
(7) Technology for Affordability	o	●		o	o		●			*	o

* Highest Priority (1) ● Priority Effort (2) o Very Important

Figure 3
(Source: Defense Science and Technology, DDR&E, July 1992)

weapon systems acquisition and will be focused toward specific capabilities to help the user.[13] Goals to define progress toward military capability will be identified within each area and the ATDs will be designed to achieve these goals. It is important to note that the seven capabilities do not encompass the entire S&T program so that large segments of research will not be "focused".

The increased focus of the S&T program has also meant a restructuring in the S&T management approach. A Defense Technology Board (DTB), chaired by DDR&E, has been created with Service Acquisition Executives and representatives from USD(A), the Joint Chiefs of Staff, the Assistant Secretary of Defense for Command, Control, Communication, and Intelligence, the Assistant Secretary of Defense for Program Evaluation and Analysis, and pertinent Defense Agencies. The purpose of the DTB is to assist the DDR&E in all S&T matters, including annual S&T investment strategy formulation and review of components' plans and programs.[14]

Thrust leaders, corresponding to the seven technology thrusts, have been identified within the DDR&E staff. Their responsibilities are to oversee and coordinate the Service and Agency programs within each thrust with the primary focus on the progress of the ATDs. In addition, key technologists for each of the 11 technology areas in exploratory development have been assigned responsibility to ensure that the technologies required by the thrust ATDs are being properly pursued within the Service

and Agency programs and support the goals of the Thrusts. This management structure has been described as a "technology management cube" with the thrusts, key technology areas, and Service and Agency programs forming the axes.[15]

The new strategy and structure in research and development is one of focus and centralized management designed to identify and refine promising military technologies in a constrained budget environment. However, to be effective, the thrusts of the S&T program must eventually provide capabilities to the warfighters through the system acquisition process.

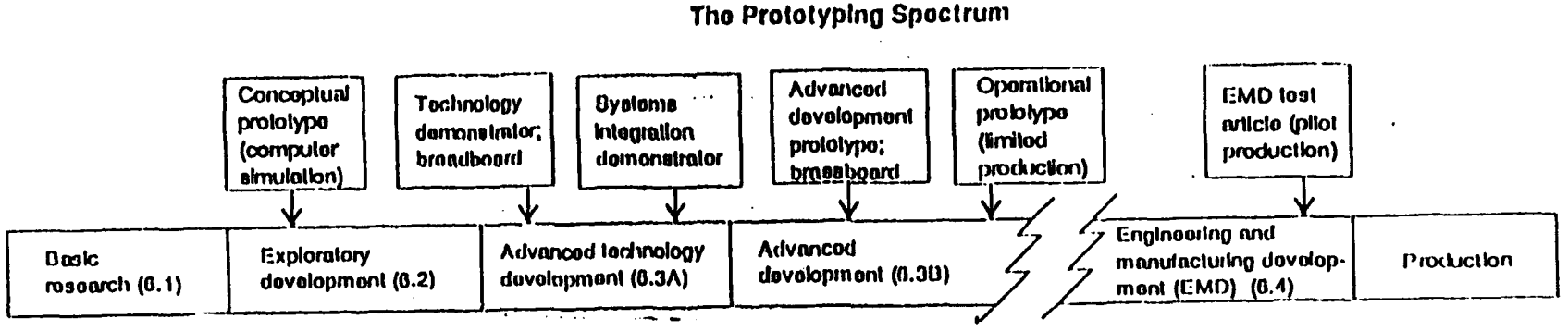
New Constraints for Weapon Systems Acquisition

According to USD(A), the acquisition process and its management structure will remain essentially as described in DODD 5000.1 and DODI 5000.2. However, the new acquisition strategy will significantly constrict the "pipeline" approach to systems acquisition. For example, as described earlier, programs will be initiated only "after the technologies critical to system performance have been proven," and "acquisition activities undertaken only when the technologies have been demonstrated, thoroughly tested, and shown to be producible."[16] This requirement for proven and thoroughly tested critical technologies prior to initiating a weapon system program at Milestone I is in contrast to the past practice of identifying

risk in critical technologies and developing a management plan at this milestone.[17]

The new acquisition strategy also calls for more extensive use of prototypes. As depicted in figure 4, prototypes can be used in all nearly all phases of the acquisition process. Conceptual prototypes are normally computer simulations which generate artificial environments to assess everything from war games to design tradeoffs and component relationships. Technology and systems integration demonstrators are functional vehicles and systems intended to answer technical questions regarding proof-of-principle of technology and design configurations. The Advanced Technology Demonstrators (ATDs) described earlier fall into this latter category. Advanced development prototypes determine whether the chosen configuration can meet program objectives in terms of cost, performance, etc. It is the first physical representation of a potential operational system. Operational and engineering manufacturing development prototypes are used to validate performance, operational suitability, manufacturing processes and controls, and projected costs.[18]

The new acquisition strategy may also considerably lengthen development timelines without the urgent pressure of Soviet weapon advancement as indicated by the Undersecretary: "...the need to replace existing weapons systems in order to maintain a significant technological advantage is no longer as urgent. As a result, we will be able to reduce concurrency in development



SOURCE: Office of Technology Assessment, 1992.

Figure 4

programs and retain existing equipment for longer periods."[19] Currently, the acquisition process for major weapon systems averages ten to fifteen years with some programs extending much longer[20] (Phalanx missile - 15 years, Patriot missile - 19.5 years, A-10 aircraft - 11 years, EF111A - 17 years).

The output end of the acquisition pipeline will also be severly constricted with the new strategy. Programs entering the acquisition process may be carried through the development phase only to be entered into low rate production without a subsequent large scale ramp up. According to Secretary Cheney in a January 29, 1992 press conference, items would be manufactured in a minimum sufficient quantity to maintain a technological and operational test capability. This slowdown in quantity and rate of production has generated serious concerns over the long term health of the US defense industrial base.[21] The new acquisition strategy addresses this concern with a new defense industrial base policy.

Industrial Policy for the Industrial Base

In defining the new strategy for acquisition, USD(A) identified four objectives for the defense industrial base. It must support the peacetime base force structure; be capable of supporting contingencies; be able to provide production capacity capable of meeting the need to combat an emerging global threat; and be efficient and cost effective.[22] To ensure the industrial

base achieves these objectives, the DOD is pursuing a four pronged strategy to:

- invest a "significant" amount of funds in procurement
- develop innovative manufacturing technologies to improve production efficiency
- establish an industrial base oversight process to identify critical items, monitor changes in these items and act to preserve them only when necessary
- stimulate changes in the industrial base to increase efficiency and competition.[23]

The first strategy leg is based on a continuing "significant" investment in procurement of $300 billion over FY 1993-1997 or an average of $60 billion per year. More recent projections have this number as low as an average of $30 billion per year.[24] The second leg of the strategy is to focus on innovation in manufacturing processes through the pursuit of a specific thrust in the S&T program called "Technology for Affordability" and adaptation of flexible manufacturing processes. "Technology for Affordability" is a research thrust aimed at significantly improving manufacturing process technology, production control, inventory management, etc. "Flexible manufacturing" is the production of small lots at unit costs similar to mass production with the flexibility to change items on short notice. Flexible manufacturing usually entails heavy reliance on automated manufacturing techniques and the adoption of a "just-in-time" supply system to reduce inventory costs.[25] The third leg of the strategy addresses the downsizing of the defense industrial base.

DOD's primary approach under the Bush administration was to let "the free market prevail through competition" with exceptions for critical processes, products, or capabilities (to include manpower skills). Critical items would be monitored for sufficiency and, in certain cases, action taken to retain the product, process or capability. Examples given of potential exceptional cases were nuclear propulsion technology and chemical agent antidote production. According to Secretary Aspin, the Clinton administration will pursue a more aggressive industrial base management approach to include the maintenance of a "warm industrial base" to prevent production gaps in items such as tanks, guns, ships, etc.

In the last leg of the strategy, DOD plans to stimulate efficiency and competition in the industrial base through opening previous in-house depot level maintenance work to private competition, application of National Defense Manufacturing Technology to a wide variety of areas, and the pursuit of commercial counterparts for once military unique products and processes. In effect, DOD is encouraging the increased reliance of defense on the commercial industrial base sectors. The execution of this industrial base strategy and management of the oversight process has been tasked to the Assistant Secretary of Defense (Production & Logistics).[26]

DOD, therefore, has embarked on a new path. The strategy of reconstitution and its related acquisition approach are intended

to lay the foundation for the edifice of US military capability into the 21st century. Will the proposed strategy produce a solid, cost effective base on which to build? The next section will examine the implications of this new strategy to help clarify the answer to this critical question.

Implications for the Future - The Technology Base

In addition to its advertised advantages, a closer look at the implications of this new policy direction for DOD reveals several potential flaws which could weaken US military capability in the next century.

The increased emphasis on research and development as well as the further centralization of science and technology management may produce unintended results. A strong technology base from which to exploit military advantage must be well funded and varied. However, as depicted earlier, the projected R&D budget is actually *declining* substantially as the end of the decade nears. From FY 1992 to FY 1997, Air Force R&D is anticipated to fall from $15 billion to $8 billion, while the Army's R&D funding is projected to decrease from $6 billion to $4 billion over the same period.[27]

This decline in real terms in R&D funding is accompanied by the increasing use of ATDs and prototypes. While prototypes have great benefit in demonstrating uncertain technologies, increasing efficiency in development and easing the transition to

production, they can be expensive.[28] A 1981 Rand study found that prototypes increased the total development costs of four major weapon systems by approximately 15-25%.[29] In addition, in the new contracts, DOD will have to pay explicitly for R&D costs instead of using the past tendency to "subsidize" research and development costs using follow-on production contracts.[30] With the total R&D budget declining and a larger portion going into the ATDs and prototypes, funding for the other areas of R&D can be expected to decline. This may mean significant reductions in funding for basic research, early exploratory development, industry's independent research and development (IR&D) and those sectors of advanced technology development not included in the seven thrusts.

The reduction in funding of this "front end" of the technology base is accompanied by the consolidation of the S&T management under the seven thrust leaders. While the thrust leader's role has been defined as one of coordinated management in the "technology management cube" as described earlier, it is important to note that they are in the position of wielding significant power in determining the future direction of technology development. In fact, experience to date led one senior service official to characterize the thrust leaders' role as one of controller versus coordinator.[31]

This centralization of power and reduced funding of the "non-thrust research" can lead to greater efficiency but may also

increase the government's tendency to "pick the winners and losers" in the research area. Historically, this has had damaging results. For example, development of the single-crystal turbine blades for jet engines was accomplished by General Electric and Pratt & Whitney under IR&D funding at a time when DOD had directed its R&D contracts toward the development of composite materials. The single crystal technology proved superior to the composites and is now in use in the most advanced engines.[32]

Loss of variety in research as a result of the reduced funding and increased centralization can also lead to trouble. The area of basic research has provided the most spectacular breakthroughs in military technologies in this century. These breakthroughs, such as radar and the atomic bomb, dramatically changed the face of the battlefield. Several years ago, the Pentagon conducted "Project Hindsight" to determine historically the source and environment of material and technology breakthroughs. The conclusion was that "most of the new systems capabilities that had been realized came not from a single quantum technological breakthrough but rather from a large number, sometimes dozens, of more modest advancements in a variety of technologies."[33] Therefore, to be effective in achieving breakthroughs and preventing technological surprise, basic research needs to be broad based and varied. However, in the context of the new acquisition strategy and budget

environment, the tendency is to retrench and concentrate the research efforts. The Director of one of the key DOD organizations tasked to manage and direct the conduct of basic research, the Defense Advanced Research Projects Agency (DARPA), announced in a statement to the Defense Subcommittee of the House Appropriations Committee on March 19, 1992, "It is necessary that our efforts be focused. The seven thrusts championed by the DDR&E science and technology strategy provide a framework to focus the program."[34] This strong tendency to concentrate its research efforts may not produce the variety required for DOD to maintain its technological military advantage into the next century.

The new strategy also calls for earlier and more continuous involvement of the warfighter in defining the needs and technology available. This proper user involvement is essential to ensuring technology is focused to meet the requirements of the battlefield. However, as Jacques Gansler points out, in addition to this type of "traditional" research and development in military technology (such as improvements in jet engines or aircraft performance), there exists the "non-traditional" research opportunities which are often resisted by the user.[35] These often prove to be the most advantageous but typically fall outside the paradigm of the military culture. Examples include the anti-ship missile and cruise missile.[36]

The warfighter is rightfully focused on the short term threat and operational needs. Care must be taken in the new strategy to balance this with the longer term view to ensure a healthy technology base.

This longer term view of the technology base has to include the economic vitality of commercial industry. Industry benefited considerably from DOD investments in the past. In fact, DOD-supported research and development produced whole industries in the 1950s and 1960s (jet aircraft, space propulsion, etc.) and accounted for approximately 50% of all R&D in the US.[37] In 1987, DOD's portion was still 31% of the US total and 16% of the total R&D spending in the European Community, US, and Japan.[38] However, as shown earlier, this infusion of DOD money is expected to decline dramatically in the future. Consequently, industry will pick up more and more of the national R&D tab to remain competitive. As Harvard's Harvey Brooks points out, successful DOD spinoffs are also less likely today because the increasing foreign competition has reduced the window of opportunity to commercialize the ideas.[39] As a result, industry is moving ahead of DOD in many technology areas such as electronics and information management. The spinoff effect of the past, therefore, may be reversed with DOD relying more on industry to provide the defense technology base. The new strategy encourages this by promoting the increased DOD use of commercial products and dual-use technology. However, the strategy fails to address

the regulatory barriers which the government oversight process has historically erected between industry's commercial and defense research. As DOD relies more on industry for R&D, the new strategy should establish a policy to review these barriers to determine their applicability to the new reality.

There is also, however, a potential flaw to this defense and commercial "merger" which should be highlighted. As industry funds more of the research and DOD relies more on commercial products, national security interests may take second place to commercial competitiveness in industry's research priorities and policies. This could lead to a short term vs long term focus for the technology base and weapons acquisition process.

Implications for the Future - Risk in Weapons Acquisition

In the weapon systems acquisition process, the new strategy calls for technologies to be proven, thoroughly tested and producibility established at Milestone I prior to the initiation of any acquisition activities. The use of ATDs and prototypes should enhance the early detection of high risk areas and help provide solutions. In effect, the strategy is "frontloading" the process to minimize the risk in development. The strategy has been described as much more risk averse than in the past with a "one strike and your out" mentality.[40] This type of policy has long been called for by many participants in and critics of DOD's acquisition process.[41]

Again, a potential flaw exists with this strategy. It may be inconsistent with maintaining a technologically superior US military force. While prototyping and testing can mitigate much of the risk, developing "technologically superior" weapons necessitates pursuing the edge of the known. Risk management rather than risk avoidance should be policy thrust. If not, US military capability could be adversely affected. For example, DDR&E uses the F-117 program as a model of a successful ATD program and the F-117 proved to be a decisive weapon in the Gulf War during the air campaign. However, the program suffered two crashes during development which most likely would have meant its termination in the more risk averse environment which DOD is now creating.

This tendency for risk aversion and more thorough program oversight will also lengthen development timelines most analysts feel. This will exacerbate a process already plagued with lengthy development cycles. The President's Blue Ribbon Commission on Defense Management stated in 1987, "...a much more serious result of this (current) management environment is an unreasonably long acquisition cycle - ten to fifteen years for our major weapon systems. This is a central problem from which most other acquisition problems stem." This lengthened cycle may increase costs, complicate the insertion of rapidly expanding technology, and contribute to "goldplating" by both the user and developer.[42]

The new strategy also calls for the use of low rate production to maintain a "warm" industrial base and reduce overall procurement costs. Several critics have questioned the capability to maintain a "warm" industrial base with low production rates of significantly reduced quantities. One senior AF official cited the B-2 production of 20 aircraft as manifestation of this type of approach. The results have been less than satisfactory with the manufacturing process still immature and unit costs escalating.[43] This latter point will be increasingly important in the new world of expanding cost consciousness in weapons acquisition due to the disappearing Soviet threat. With flatter manufacturing learning curves and costs amortized over fewer production articles, the unit costs would dramatically increase. This may in turn cause significant Congressional resistance to fund such "high cost" weapons and generate additional cutbacks. The downward spiral effect has been experienced in the past and could threaten the US industrial base capability even more in the future.

Implications for the Future - A "Flexible" Industrial Base

Concern over the competitiveness and health of the US industrial base as a whole has spurred many calls for change. Primarily the demand has been for a transition from mass production to the lean production and flexible manufacturing

systems exemplified in Japan. The new acquisition strategy echoes this demand:

> "Flexible manufacturing processes...to produce more than one type of item...makes the production of a smaller number of each type of item more efficient, which will release reliance on economies of scale..[44]

The transition to flexible manufacturing and lean production has transformed the Japanese automobile industry into the world class competitor of today. As a result of the new acquisition strategy, the residual US defense industrial base may take on much more of this commercial character to maintain its future competitiveness.

As the US continues a post Cold War industrial base demobilization unseen since World War II, the ability to mobilize in the face of an emerging threat becomes more and more crucial. The transition to lean production and the increasing importance of mobilization could have serious implications for future US military power. For as pointed out in an MIT study of the lean production system, it has a significant weakness - sensitivity to production volume changes:

> "Lean production is characterized by extraordinary flexibility in shifting the mix of products manufactured and doing so on only a few hours notice. At the same time, the system is <u>extremely</u> sensitive to fluctuations in the total volume made."[45]

In fact, as reported by the MIT researchers, the system is so sensitive to volume surges, the Japanese must practice production "smoothing" to attempt to hold the volume produced constant.[46] Dramatic volumetric increases in production which are typical in

a defense industrial base mobilization could play havoc with such a manufacturing system if adopted across a wide spectrum. As DOD implements its new strategy, it should be aware of this characteristic and plan accordingly in the event of an industrial base mobilization.

Tomorrow's New World Order Today - The French Experience

The strategy which the US is pursuing is not entirely new in the western world. The French adopted a very similar defense approach several years ago. While there are significant cultural, governmental, and structural differences between the US and French defense establishments, the French strategy echoes many of the basic tenets of the new DOD reconstitution strategy and acquisition approach. These include increased investment in defense R&D at the expense of current production, converting national arsenals into state-owned companies to protect critical capabilities, encouraging defense industry diversification into the commercial sector, urging firms to concentrate on areas of excellence to improve competitive advantage and promote greater reliance on dual-use technologies.[47] France had already centralized its acquisition management with the creation of the General Delegation for Armaments or DGA in 1961. Therefore, it would be beneficial to conclude this paper with a brief examination of some of the impacts of the French acquisition

strategy as describe in a 1992 Congressional Office of Technology Assessment study of their weapons acquisition system.[48]

The researchers found that the strategy has had both desired effects and unintended impacts. The increased emphasis on R&D and centralization of defense acquisition management resulted in a central organization which was able to focus research to militarily useful technologies, limit new weapon development and consolidate weapons procurements to eliminate redundancies in service acquisitions. Examples included the *Mistral* air-defense system purchased for all services and *Rafale* fighter acquired for the Air Force and Navy. It has also resulted in the definition and pursuit of a coherent strategy for managing the industrial base which strives to optimize the health of the defense-civil industrial base instead of individual sectors. The commercial and defense industrial bases have been merged to significant extent with the DGA relying heavily on commercial products and technology.[49]

However, the unintended impacts of their approach reflect some of the concerns outlined previously regarding the new US strategy. Many critics have observed that the French policy resulted in the government's selection of "winners" in research and development who then became monopolistic suppliers. Over time, the government's reliance on these suppliers, such as Dassault Aviation or SNECMA, resulted in a loss of innovation and increased development costs. For example, DGA pursued Dassault's

Rafale fighter in spite of the French Navy's strong preference on purchasing the more cost effective and available US F/A-18 *Hornet*.[50] Without the effective airpower capability, France's two aircraft carriers served only as cargo ships to deliver equipment during the Gulf War. In addition, the loss of innovation was demonstrated by the lack of night avionics and advanced radar equipment on the French aircraft participating in the war which is required to be effective in modern warfare.[51]

The merging of the defense and commercial industries combined with the pursuit of competitiveness resulted in commercial pressures taking precedent over defense concerns. Prior to the Gulf War, competitive pressures caused French industries to reduce overhead costs which militated against maintaining a mobilization capability. Surge capability was therefore limited to battlefield consumables such as food, spare parts, etc. This loss of mobilization capability, combined with funding reductions of stockpiles, resulted in shortages during the war. In fact, antitank missiles and laser-guided bombs had to be purchased from Germany to meet battlefield requirements.[52]

In essence, even though the French emphasized research and development, the government's centralized management resulted in a loss of innovation and increased costs. And while the centralized structure focused on the long term strategy for the technology base, it did so at the expense of France's current military capability.[53] Conversely, in the industrial base areas,

the focus was driven to the immediate short term by the reliance of defense on commercial industry and the demands of commercial competitiveness. This resulted in the loss of crucial long term mobilization planning.

Conclusion

The end of the Cold War and emergence of a new world order has indeed positioned US defense policymakers in a new environment which requires both innovation and caution. The challenges and threats to US national interests in the 21st century will be met with the defense capabilities built upon the foundation being formed today. The concept of reconstitution and the acquisition strategy which it encompasses can provide a strong foundation as long as it contains this balance of innovation and caution.

The emphasis on research and development must not be at the expense of sufficient current military capability. The focused centralized government management and consolidation of research and development for efficient resource utilization must not be at the expense of variety and innovation. The short term pressures of the warfighter and commercial competitiveness in a merged civil/military industrial base must be balanced with the longer term focus of mobilization capability and military technological superiority. By attaining this balance, the US can be confident it has the strength to meet its challenges and reside peacefully in the new world order.

Notes

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2. National Security Strategy 1992

3. ibid.

4. DDR&E Defense Science and Technology Strategy. U393.D43 July, 1992

5. USD(A) Memo 20 May 1992 w/attach

6. Aspin, L. "Tomorrow's Defense From Today's Industrial Base: Finding the Right Resource Strategy For A New Era." Feb 26,1992

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